

REMARKS

Claim 13 has been amended to include a feature from claim 1. No new matter has been added.

Claims 1-24 are pending, of which claims 13-24 have been withdrawn from consideration.

Information Disclosure Statements

The Patent Office on page 2 of the Office Action stated that the Information Disclosure Statement filed on October 17, 2005 ("10/17/05 IDS"), and November 15, 2005 ("11/15/05 IDS") fail to comply with 37 CFR 1.98(a)(2). Applicants submit that the 10/17/05 IDS and 11/15/05 IDS did comply with 37 CFR 1.98(a)(2). As stated in the 10/17/05 IDS, copies of the listed documents were not being provided since copies had been provided directly by WIPO under an exchange program between the PTO, the EPO and the JPO. Accordingly, applicants respectfully request the Examiner to consider documents A2 through A5 listed on FORM PTO/SB/08 from the 10/17/05 IDS, and provide applicants with an initialed copy of that FORM. With respect to the 11/15/05 IDS, the listed document B2 is the same as document A4 of the 10/17/05 IDS, where the authors name of document B2 was corrected on the FORM PTO/SB/08 from the 11/15/05 IDS. Accordingly, applicants respectfully request the Examiner to consider document B2 listed on FORM PTO/SB/08 from the 11/15/05 IDS, and provide applicants with an initialed copy of that FORM. Moreover, for the convenience of the Examiner, copies of documents A2 through A5 (Document B2 is the same as document A4 as discussed above) are being submitted herewith.

Rejection under 35 U.S.C. § 103

Claims 1-12 stand rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 5,170,231 to Fujii et al. ("Fujii") in view of U.S. Patent No. 6,677,648 to Ohmi ("Ohmi"). Applicants respectfully traverse these rejections for at least the following reasons.

Independent claim 1 recites:

A semiconductor device characterized by comprising

*a semiconductor substrate made of SiC; and
an insulating film formed on said semiconductor substrate,
wherein said insulating film is formed by a plasma treatment and contains a
rare gas at least partly.*

Fujii and Ohmi fail to suggest the above combination of features of an insulating film formed by a plasma treatment and containing rare gas at least partly formed on a SiC semiconductor substrate, or its benefits in suppression of an increase in interface states (See specification, page 1, lines 17-20, page 5, lines 19-21).

Fujii discloses a device with a SiC semiconductor substrate 30, and an insulating film 33 of thermal oxide formed on the SiC semiconductor substrate. Fujii discloses its insulating film 33 to be formed as a thermal oxide by subjecting the n-SiC single-crystal layer 31 (FIG. 3C) and the p-SiC single-crystal layer 32 (FIG. 3C) grown on the SiC substrate 30 to a thermal oxidation in an atmosphere of oxygen at about 1100°C for 3 hours to obtain a thermal oxide film 38 (FIG. 3D), and by forming the thermal oxide film 38 into a predetermined pattern (col. 9, lines 50-59 in Example 2).

Fujii, however, in contrast to the structure of claim 1, does not disclose its insulating film formed by a plasma treatment and containing rare gas at least partly, on its SiC substrate. Rather as discussed above, Fujii merely discloses a thermal oxide formed on its SiC substrate. Thus, the structure of the Fujii device, where the oxide is formed as a thermal oxide, would be expected to have an increase in interface states (See specification, page 1, lines 17-20, page 5, lines 19-21), and thus the structure of claim 1 is different from that disclosed in Fujii. Moreover, Fujii does not disclose or suggest that its insulating film 33 contains a rare gas at least partly as recited in claim 1.

The Patent Office on page 3 of the Office Action states: “it is the patentability of the final structure of the product ‘gleaned’ from the process steps, which must be determined in a ‘product by process’ claim, and not the patentability of the process.” Applicants note, as discussed above, that in the present case, the structure of the Fujii device, where the oxide is formed as a thermal oxide, would be expected to have an increase in interface states, and thus the structure of claim 1 is different from that disclosed in Fujii.

Ohmi fails to cure the deficiencies of Fujii. Ohmi discloses a silicon oxide film 1701 formed on a Si semiconductor substrate 1703 (FIG. 17B, col. 10, lines 1-4, 21-25). The silicon oxide film is formed by oxidation using a Kr/O₂ high density plasma (col. 10, lines 21-25).

Ohmi, however, does not disclose or suggest forming its silicon oxide film on a SiC semiconductor substrate. Quite the contrary, Ohmi discloses: “the stress in the silicon oxide film (1701) and the stress at the interface between silicon and the silicon oxide film are relaxed.” (emphasis added). Thus, Ohmi merely discloses that its silicon oxide film reduces stress with a Si substrate. Ohmi does not suggest that its silicon oxide film would reduce stress with a SiC substrate, much less reduce interface states as disclosed in the present application. Thus, the Patent Office has failed to provide a properly articulated reason regarding why one skilled in the art would have included the silicon oxide film of Ohmi in the device of Fujii, which has a SiC substrate.

As disclosed in the present specification, a Si substrate and a SiC substrate are not equivalent for forming an oxide thereon. As disclosed in the specification on page 1, lines 17-20: “However, SiC has a hexagonal structure and thus has no plane corresponding to a (100) plane of silicon and, when an insulating film is formed by a conventional heat-treatment method, interface states significantly increase to degrade device properties.” Thus, the present inventors recognize a difference between silicon and SiC and degradation of the properties of the insulating film formed by subjecting SiC to the heat-treatment. Fujii and Ohmi fail to recognize this difference or to suggest a solution.

Independent claims 10-12 have features corresponding to those discussed above with respect to claim 1, and are patentable for analogous reasons.

The dependent claims are patentable for at least the same reasons as their respective independent claims, as well as for further patentable features recited therein.

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing or a credit card payment form being unsigned, providing incorrect information resulting in a rejected credit card transaction, or even entirely missing, the

Respectfully submitted,

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FOLEY & LARDNER LLP

Customer Number: 22428

Telephone: (202) 945-6014

Facsimile: (202) 672-5399

By Thomas G. Bilodeau

George C. Beck

Attorney for Applicant

Registration No. 38,072

Thomas G. Bilodeau

Attorney for Applicant

Registration No. 43,438